reduce the effect of these sites, the invention has gone beyond the use of a sheared beam but has taken and given the sheared beams different polarization in the medium along the imaging plane. (See lines 3 and 4 of Claim 29 and line 3 of Claim 34). These different polarizations are preferably orthogonal or more preferably circular polarizations in opposite senses. The different polarizations provide for destructive interference, at the detector, and in the case of the confocal imaging system at the confocal aperture, of light returned from the sites above and below the section of interest.

Since the references are interested only in profile measurement at the surface of the specimen, the beams are not overlapping in the mediums as specifically called for in Claims 30 and 35. The Examiner will appreciate that the problem of image quality reduction due to returns from the sites outside the section of interest is not a problem with the references used by the Examiner. Applicant's system reduces the probability of interference in the image at the section being imaged, while enhancing the probability of interference outside the section by the use of special polarization effects, namely different polarizations in the medium along the imaging plane.

What is going on in the prism is not effective in providing the polarizations in the medium and as defined in the imaging plane. There is no polarization circularizing optics after the prism in the Barenboim or other references, which will provide polarizations causing the interference due to reflections from the sites outside the imaging plane in the medium. Applicant is cognizant of the first paragraph in column 5 which points out that the polarizations in the beams 48 and 50 are perpendicular. But the perpendicularity as pointed out is along the axis and in a plane perpendicular to the optical axis. Thus there is effectively no different polarization as called for in the rejected Claims. In so far as the limitation of image generation is concerned, the two polarizations are separated and looked at in separate detectors 66 and 68 for obtaining phase differences from which the profile of the specimen's surface may be determined. This is a different functionality than Applicant's means for generating the image of the section in the last limitation of the

rejected Claims 29 and 34. The references have no need of a polarization parameter such as the degree of rotation of polarization or differential circular dichroism or optical activity as in Claims 33, 34, 37 and 38. Accordingly these Claims are not anticipated or made obvious from anything in Barenboim or the other references.

In paragraph 7 of the Detailed Action, Claims 29 to 38 were rejected as anticipated by Bou-ghannam (631).

The scheme of Bou-ghannam is essentially identical to Barenboim (note the Patents have the same source IBM and there are overlapping inventors). The Bou-ghannam scheme is described starting on column 8 at the bottom of that column and also in the third full paragraph of column 9 and in the last full paragraph of that column. The arguments presented above with respect to Barenboim are therefore equally applicable with respect to Bou-ghannam.

In Item 8 of the Action, Claims 29 to 38 were rejected as anticipated by Ooki (363).

Although Ooki has about 25 embodiments, they are really in two classes starting with the Figs. 1 to 16 embodiments and the Figs. 17 to 25 embodiments. As to the Fig. 1 embodiments, please see the discussion in column 25 of Ooki. There is only a corresponding phase-shift of pie in each of the two beams, which leave the Nomarski prism. This phase-shift combined with the two retarders 10 and 11 after the beam splitter serve to bias the brightness of the resultant image to allow for phase sensitive imaging of a surface with two different reflectivities. There is no polarization difference (as in opposite senses) illuminating a turbid specimen where there are scattering sites above or below the section of interest. There is no statement that the beams overlap in order to reduce the effect of scattering sites above and below the section of interest (see Claims 30 and 35). There is polarization separation in the detection process in order to get two signals, the phase difference between which is representative of the height difference on the surface of the specimen. There is no different polarization along an imaging plane.

The Fig. 17 embodiment is discussed in column 45 although there are two linearly polarized light beams having polarization directions perpendicular to each other, these are not in the imaging plane and there would be no need for different polarizations in the imaging plane as claimed which can provide returns which interfere from sites outside of the imaging plane.

Accordingly Ookie is respectfully submitted to be cumulative with Bou-ghannam and Barenboim. Accordingly for the reasons urged above, Claims 29 to 38 are not anticipated and also patentably distinguish over the references used by the Examiner.

In Item 9 of the Action the Examiner has rejected Claims 29 to 38 as being anticipated by Smith (884). Smith is another profilometer using sheared beams and the arguments concerning image-enhancement by reduction of interference from sites outside the section of interest as discussed above does not arise with the Smith instrument. The Examiner states that Smith shows beams incident at spots spaced laterally from each other. This is respectfully submitted to be contradicted by Smith in column 4, lines 63 to column 5, lines 7. In the Smith profilometer height measurements depend only on the angle, which the components A and B of the beam make with the surface of the specimen. The beam is returned from the surface and there cannot be overlapping in the medium to provide for interference of the light returned from sites adjacent to section where the image is taken. There is no polarization separator and retarder in a location in the Smith optics, which provide different polarizations in the imaging plane.

As argued above with respect to the image generating means and steps of the rejected Claims, there is no response to a polarization parameter. The Smith analyzer 15 merely pulls the polarization components apart after they are recombined in the Smith prism so that an interferometric measurement can be obtained from which the angular distance can be determined (see column 5, lines 55 to 61 and the paragraph bridging columns 7 and 8). Smith does not address the problem of enhancing image quality by reducing returns from outside the section to be imaged, but it is merely for a form of

shearing interferometer profile measurement instrument which directs two components at different angles of incidence to a single point on a surface under investigation. Smith merely extracts the components after reflection so that an interferometric measurement can be made to determine the profile. Accordingly for reasons similar to those urged above, Claims 29 to 38 are neither anticipated nor obvious from Smith (884).

Claims 39 to 42 were rejected as being unpatentable over all of the references noted above. While Claim 39 and the other claims dependent thereon do not say that the sheared beams have different polarization in the image plane, they do point out that the sheared beams have opposite sense of generally orthogonal polarization. Such opposite sense of orthogonal polarization does not appear to be used in the references of record. The polarizations may be orthogonal but they are not in opposite senses. Opposite senses of orthogonal polarization would be contraindicated in case of profile measurements. They are an important feature provided by the invention in order to enhance image quality by reducing interference by scattering sites outside the image plane. In the references of record there is no overlapping of beams outside of the vicinity of the image planes. Certainly there is no generally circular polarization as called for in Claim 42. Accordingly there are limitations in Claims 39 to 42, which would prevent these Claims from being made obvious by any of the references of record as will be apparent from the foregoing discussion of the references. The Examiner contends that utilizing polarization enhancement, as Claimed with interferometry is obvious. However, the Examiner has not cited any reference, which could be authority for the obviousness of the combination. Moreover, it is respectfully submitted that imaging by interferometric means is unnecessary in the profilometers of the principle references. Accordingly there is no need for nor would anyone skilled in the art be led to the use of interferometric imaging elements in a polarization enhancement system as claimed in Claims 39 to 42. It is, therefore, respectfully submitted that without any such teaching of the application of interferometry in a system having polarization enhancement is not subject to official

notice. As required by the Rules of Practice, Applicant hereby requests that the citation of a reference or other authority or the withdrawal of the rejection based on official notice.

In Items 12 to 14 an obviousness-type double-patenting rejection was entered. A terminal disclaimer to obviate this rejection is enclosed. This terminal disclaimer should be entered and the fee therefore ($55) should be applied only after allowance of a Claim and the passage of this Case to Issue.

Respectfully submitted,

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Enclosure: Terminal Disclaimer

APPENDIX

MARKED-UP VERSION OF AMENDED PARAGRAPH ADDED BY PRELIMINARY AMENDMENT ON PAGE 1, LINES 3-4:

This application is a continuation of Application Serial No. 08/966,046, filed November 7, 1997, [now pending] now U.S. Patent No. 6,134,009, issued October 17, 2000.

MARKED-UP VERSION OF AMENDED PARAGRAPH ON PAGE 6, LINE 22 TO PAGE 7, LINE 7:

Because the incident polarization 46 contains components of polarization parallel to both optical axes of the prism sections, the prism 42 splits or shears the incident beam 56 into two linearly polarized beams, A and B. The axes of polarization for the two beams are parallel to each of the optical axes of the two prisms in the Nomarski's prism. The shear is in a direction transverse to the direction of propagation of the incident [bean] beam 56. Both beams pass through a 90° phase retarder with its fast axis 45° to each polarization axis of beams A and B. The [beans] beams A and B are focused at spots C and D, respectively in the focal or image plane 58. It will be appreciated that these spots are scanned in X and Y over the image plane in order to provide optical signals from which the image can be constructed, after detection by the detector 24, in the computer 22. Preferably the spots substantially overlap. They are suitable separated by a distance, D/4, where D is the Airy diameter of focal spots formed by the objective 30.